



# SCIENCE ON THE HILL

The Community Newsletter of Lawrence Berkeley National Laboratory

Summer 2001

## Berkeley Lamp Lights the Way

In the face of California's growing energy crisis, Berkeley Lab researchers specializing in energy efficiency and lighting have developed a new high-performance lamp that can produce the power of a halogen lamp with only a fraction of the energy requirement.

Set to hit commercial markets later this summer, the energy-efficient table lamp will help homes and offices reduce power consumption while maintaining high-quality lighting.



**Available in stores later this summer, the energy-efficient Berkeley Lamp greatly increases lighting quality and visibility while using only a quarter of the energy.**

The "Berkeley Lamp" has a unique two-bulb design that allows the user to control the distribution and intensity of light by selectively illuminating either the ceiling or the desktop, or both. At full power, this two-lamp system matches the combined output of a 300 watt halogen lamp and a 150 watt incandescent lamp, while using only a quarter of the energy. Lab researchers and California utilities are working together to produce the first 600 prototype lamps, which will be field tested in offices, residences and hotels this summer.

For the full story, visit <http://eetd.lbl.gov/btd/lsr/projects/table/faq.html>

### Energy

Berkeley Lab is at the forefront of energy-efficiency research, specially crucial during the present energy crisis. Go to the Lab's "20% Solution" website at <http://savepower.lbl.gov/> to take advantage of the 20/20 Rebate Program that offers a 20% rebate on June-September 2001 electricity bills for customers who use at least 20% less electricity than they consumed June through September during 2000.

To keep track of California's daily electricity supply and demand, go to <http://energycrisis.lbl.gov/>



### Savers

showcase our scientific endeavors, our Speaker's Bureau that provides experts to address community groups on a wide range of scientific topics, along with general information about the Laboratory's many research accomplishments. Also take a look at our extensive website at [www.lbl.gov](http://www.lbl.gov).



## WELCOME TO BERKELEY LAB

On the hill above the UC Berkeley campus, the Lawrence Berkeley National Laboratory has a vista that spreads out over the city and across the Bay. Our scientific enterprise extends even further, reaching across the country and around the world. Because of our deep roots in the local community, the Lab has launched a quarterly newsletter featuring news about our latest scientific discoveries, our educational outreach programs, and the ways in which science is making a difference in both the quality of our lives and our knowledge of the world around us. Look to these pages for news about Lab tours that



Berkeley Lab offers a range of activities promoting science education for students from middle school through college.

Reflecting our ongoing commitment to science education, the Lab is involved in many programs that expand the scientific knowledge of both students and teachers in the classroom. From our Service Partnership with Vallejo science teachers, our summer intern program, and our numerous educational web sites (see [www.lbl.gov/Education/index.html](http://www.lbl.gov/Education/index.html)) to our tours for schools and organizations, the Lab is reaching out to the future scientists of our community. For more information on our tour program or to request a speaker, call our community relations office at 486-5183.

## Local Resident, Global Citizen

### Lab Sponsors Exhibit at Hall of Health

Berkeley Lab has installed a new exhibit at the Hall of Health children's museum and science center entitled "Health and Your Environment."

The exhibit addresses the impact of air, water, and soil quality on health, the risks and benefits of radiation, problems associated with noise pollution, and home poisoning prevention. Each panel includes a hands-on activity, such as a Geiger counter to test household items for radioactivity. The Lab developed the exhibit, as well as provided the funding and the professional and technical support needed to create the display.

"This exhibit ties together important environmental issues that affect kids and families," says Lucy Day, the museum coordinator, "while also touching on research being done at the Lab." For more information, visit the Hall's website at <http://www.hallofhealth.org/>

### Saving Lives

Every year contaminated drinking water kills 3.8 million children, mostly in developing countries. In order to address this situation, Berkeley Lab's Ashok Gadgil developed an ultraviolet-based water disinfection device known as UV Waterworks. A small, simple device, UV Waterworks uses ultraviolet light to quickly, safely, and cheaply disinfect water of the viruses and bacteria that cause cholera, typhoid, dysentery and other deadly diseases. Weighing only 15 pounds, it purifies 4 gallons of water each minute, using less energy than a desk lamp, and can run on a car battery, bicycle generator, or solar cell. The device purifies water at a cost of only a few cents for every 1,000 gallons. Licensed to WaterHealth

International, Inc., UV Waterworks is used as a source of day-to-day drinking water and for emergency situations in South Africa, Nepal, Bangladesh, India, Central America, Mexico and the Philippines. In Manila alone, several thousand people now purchase their daily drinking water from vending stations with UV Waterworks.

For more information, go to <http://eetd.lbl.gov/cbs/archive/uv/>



UV Waterworks, shown here at a field test in India, can disinfect 1,000 gallons of water for only a few cents.



### Berkeley Lab and the Hubble Telescope Set an Astronomical Record

Berkeley Lab astrophysicist Peter Nugent has confirmed that newly sighted Supernova 1997ff is the oldest and most distant Type Ia supernova ever seen, a star that exploded 11.5 billion years ago. Working with the Space Telescope Science Institute, Nugent used the Lab's National Energy Research Scientific Computing Center (NERSC) to analyze data from an exploding star that had been caught by NASA's Hubble Space Telescope.

Now, those images are helping scientists unravel the mysteries of how the universe expanded.

Images from Supernova 1997ff suggest the universe slowed its growth after the big bang, leading scientists to believe that gravity worked to slow the expansion until the distances became so great that a mysterious repulsive force of "dark energy" outmuscled the pull of gravity, creating the current era of accelerating expansion.

Albert Einstein first predicted, then retracted as a mistake, the existence of the repulsive anti-gravity causing the accelerating growth of the universe. Today, explaining dark energy remains one of the most important problems in physics and astronomy

For the full article, go to <http://www.lbl.gov/Science-Articles/Archive/oldest-la-supernova.html>



**Berkeley Lab researchers confirmed Supernova 1997ff (shown here) to be the oldest of its kind ever found.**



### A Breath of Hope

Over the last 15 years, the number of asthma patients has doubled, with children living in urban areas particularly susceptible. The numbers continue to rise, and this year nearly 5,000 people are expected to die from complications related to the disease. Through an intensive hunt that began four years ago, researchers in Berkeley Lab's Life Sciences Division have discovered the two genes that contribute to the development of asthma. Scientist Edward Rubin and his team, departing from the traditional research technique that focuses on one gene at a time, examined several genes in concert and found not only the asthma genes, but also found that decreasing the activity of these two genes could help reduce susceptibility to asthma attacks. In a prime example of the work made possible by the Human Genome Project, Rubin's team made an important scientific discovery while also developing an unconventional research approach that may now be applied to other complex genetic conditions — such as hypertension and obesity — where multiple genes contribute to a single disease.

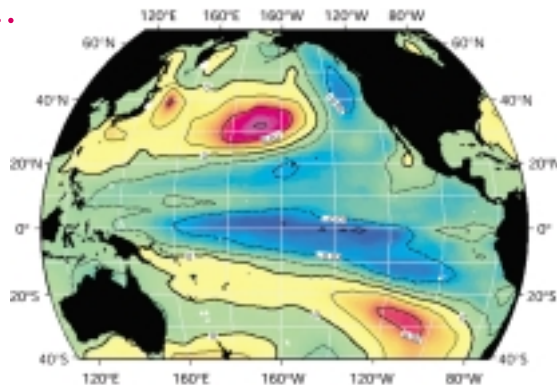
For more information, visit <http://www.lbl.gov/Science-Articles/Archive/asthma-genes.html>

### The World's Most Powerful Unclassified Supercomputer

In the latest ranking of the world's 500 most powerful supercomputers, Berkeley Lab's 2,528-processor IBM system is listed as the top unclassified supercomputer on Earth. The IBM supercomputer, which is the newest high-performance computer in the National Energy Research Scientific Computing Center (NERSC) at Berkeley Lab, can compute 3.8 trillion calculations per second. By performing such massive calculations, NERSC is able to significantly accelerate the pace of scientific discovery.

Housed in the new Oakland Scientific Facility, the supercomputer is used by more than 2,000 researchers at national laboratories and universities across the country to study global issues such as improving internal combustion to increase efficiency and reduce pollution, researching future sources of energy, improving human health, understanding global climate change, and studying the nature of the universe.

The new Top 500 List of supercomputers can be found at <http://www.top500.org/>.



**Global climate modeling is an example of the large-scale research being done at NERSC. Here, sea surface temperatures are compared to atmospheric conditions in order to develop criteria for more accurate seasonal rainfall forecasting.**

# Reducing Berkeley's Wildfire Threat Through Vegetation Management

Long before the Oakland Hills firestorm of 1991, Berkeley Lab was committed to actively managing its hillside environment to minimize the threat of wildfires. Today the Lab continues its aggressive campaign to reduce fire danger to the community by not only an unending vegetation modification effort, but also through our role as a charter member and active participant in the Hills Emergency Forum, and our participation in the automatic aid agreement between the Lab and the City of Berkeley in which the Lab is the first responder to fires within a one mile radius around the Lab.



An intense effort to reduce the Lab's fire risk has paid off through vegetation management work, such as identifying areas with significant fire-hazard potential and the thinning and removal of high-fuel brush and eucalyptus trees. Lab emergency manager Don Bell points out that this work has made the Lab a fire shield for the city below. "There is so little fuel here, a fire in the hills would be extinguished before reaching the city."

For the full story, visit <http://www.lbl.gov/Science-Articles/Archive/fire-shield-vegmosaic.html>

## Berkeley Lab Contacts

COMMUNITY RELATIONS:  
Terry Powell (510) 486-4387

TOURS :  
David Malone (510)486-5183

EDUCATION OUTREACH:  
Rollie Otto (510) 486-5325

ENVIRONMENTAL  
INFORMATION:  
<http://www.lbl.gov/ehs>

*Science on the Hill* is produced by the Berkeley Lab Public Affairs Office.  
Lisa Gonzales, Editor  
[llgonzales@lbl.gov](mailto:llgonzales@lbl.gov)

.....

Berkeley Lab is managed by the University of California for the U.S. Department of Energy.

First Class  
U.S. Postage  
PAID  
Berkeley, CA